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(56) Documents Cited

**GB 1522042 A**

**US 4715263 A**

(58) Field of Search

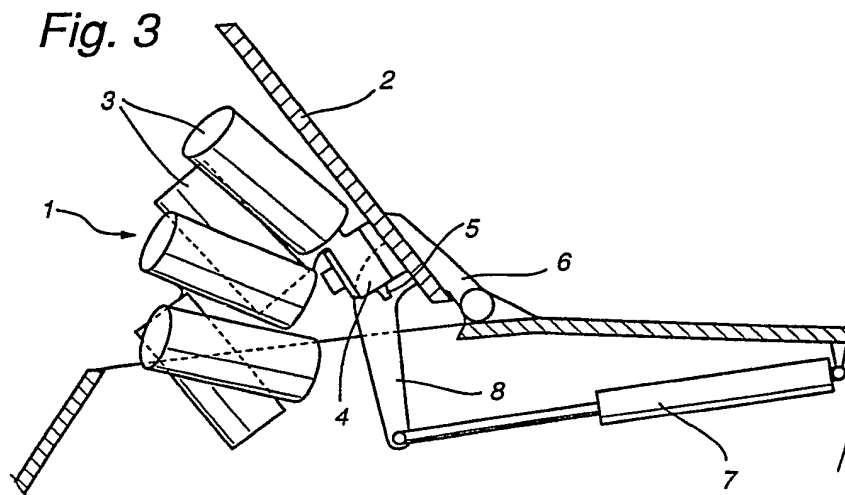
UK CL (Edition M ) **F3C CAJ CGA CGX CJA CMA CMB**

INT CL<sup>5</sup> **F41A , F41F , F41H**

**Online database: WPI**

## (54) Smoke grenade launching system of an armoured vehicle

(57) A smoke grenade launching system of an armoured vehicle having a plurality of dischargers 3 which are each aligned differently and are combined three-dimensionally in a fan shape to form a launcher unit 1. The launcher unit 1 is articulated, such that it can be adjusted in azimuth, on a roof hatch flap 2 of the vehicle, on that side of said flap which is located inside the vehicle in the closed state, the roof hatch flap 2 being pivotable through an adjustable rotation angle about a horizontal axis 6 for elevation aiming of the launcher unit 1.



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Fig. 1

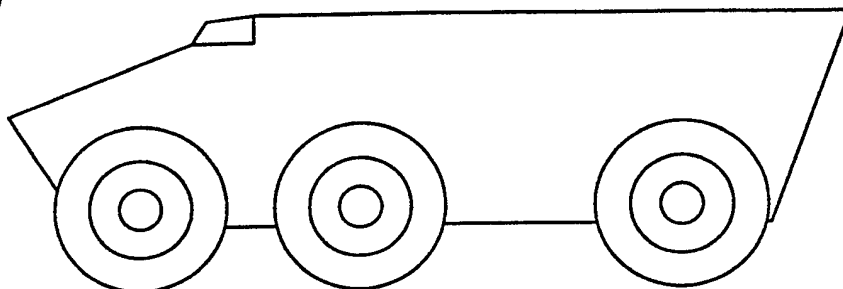


Fig. 2

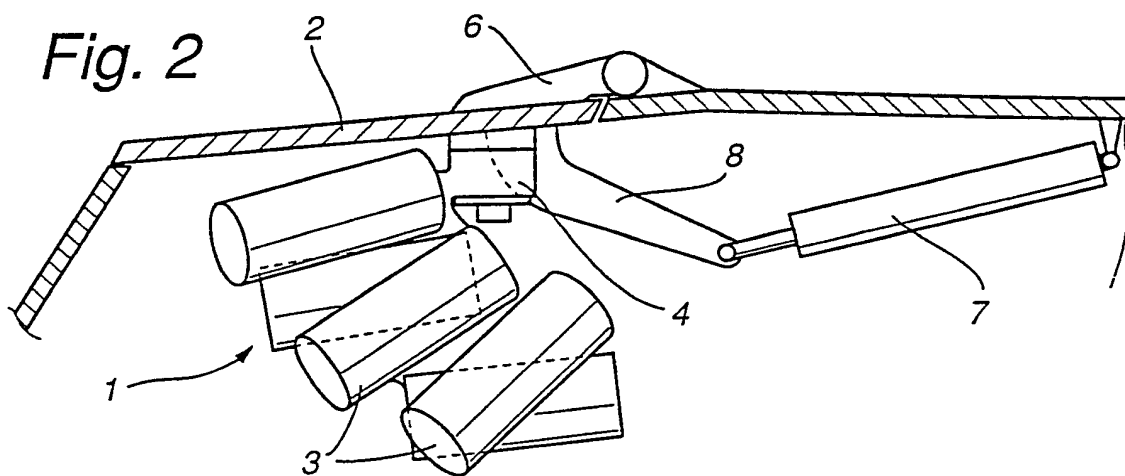
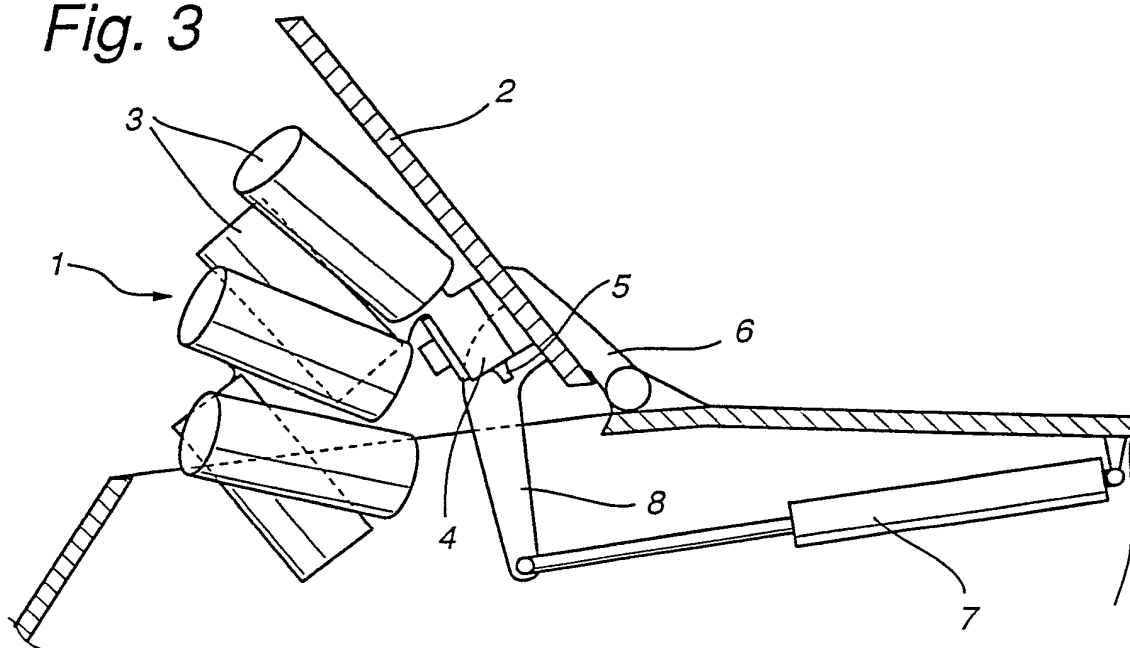
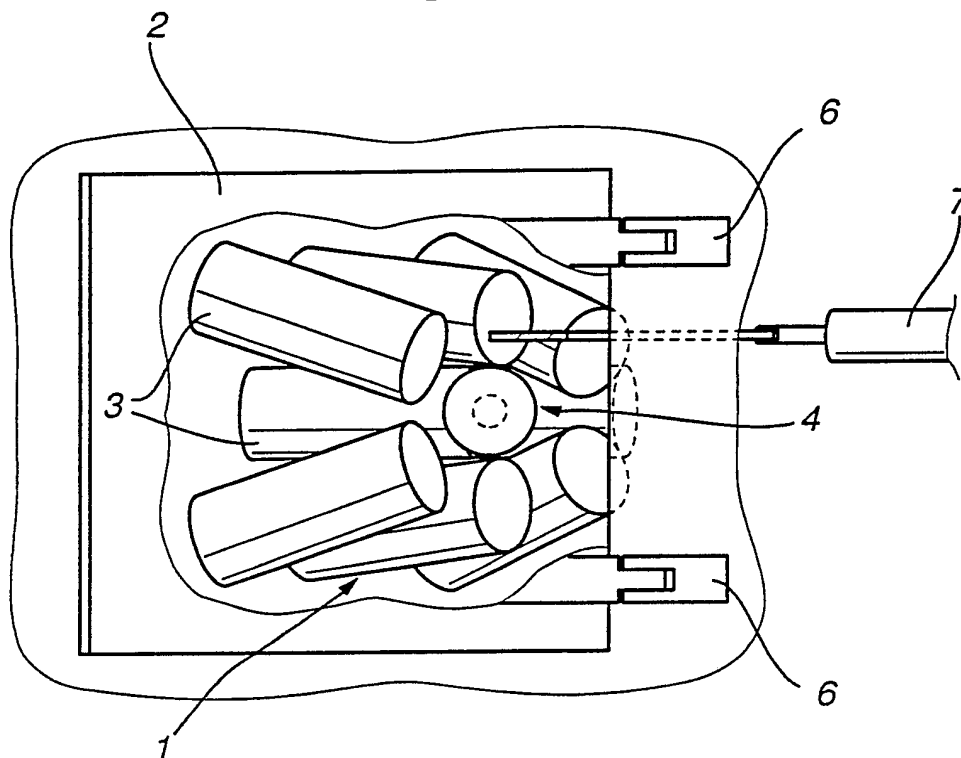
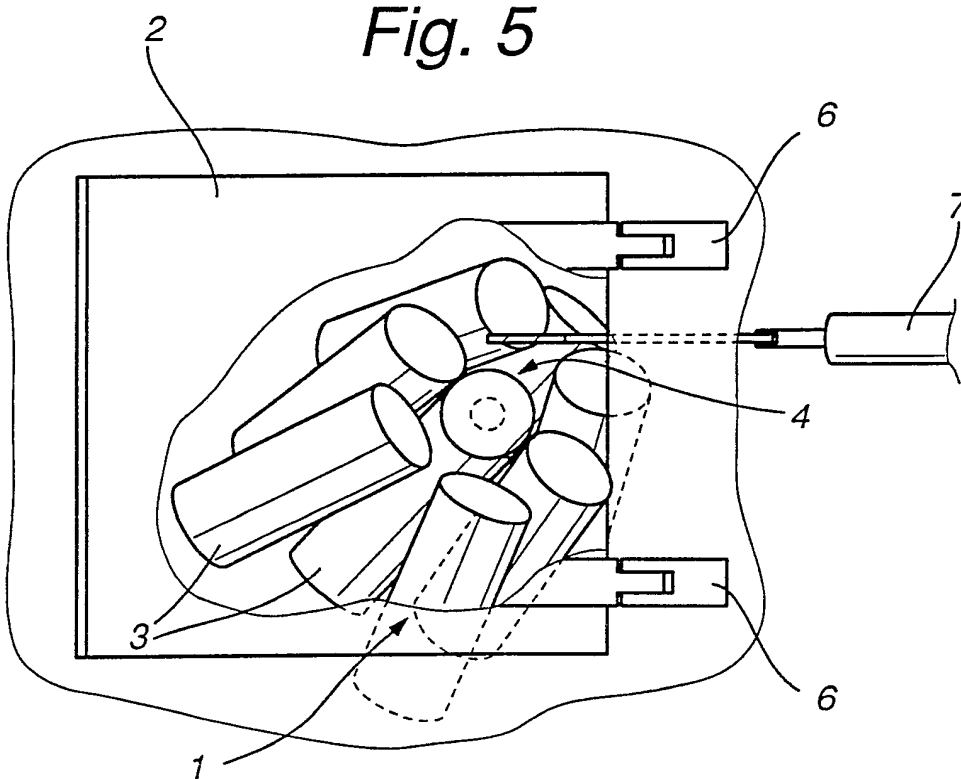


Fig. 3



*Fig. 4**Fig. 5*

Smoke grenade launching system of an armoured vehicle

The invention relates to a smoke grenade launching system of an armoured vehicle having a plurality of dischargers which are each aligned differently and are combined three-dimensionally in a fan shape to form a launcher unit.

Such a system is known from DE 37 05 700 C2.

In order to avoid any possibility of using radar to locate the vehicle to which such a smoke grenade launching system is fitted, said system should not be fitted without any cladding on the outer skin of this vehicle.

On the basis of this, the invention is concerned with the problem of creating a smoke grenade launching system which has no unfavourable effect on the lack of capability of radar to locate the vehicle, at least in the unactivated state, can be aimed well and easily in elevation and azimuth and, furthermore, can be reloaded while being protected against attack. Furthermore, aimed individual shots are intended to be possible from the individual dischargers of the launcher unit.

According to the present invention there is provided a smoke grenade launching system of an armoured vehicle having a plurality of dischargers which are each aligned differently and are combined three-dimensionally in a fan shape to form a launcher unit, wherein the launcher unit is articulated, such that it can be adjusted in azimuth, on a roof hatch flap of the vehicle, on that side of said flap which is located inside the vehicle in the closed state, the roof hatch flap being pivotable through an adjustable rotation angle about a horizontal axis for elevation aiming of the launcher unit.

A simple capability to reload the individual dischargers is provided if the roof hatch flap is arranged in the side region of the vehicle, adjacent to a crew member in which case, the launcher unit can be reloaded in the protected state. For this purpose, it need only be rotated

to the side in the retracted position in order to be more accessible for the operator, who may be the driver.

In the case of the design according to the invention, elevation aiming is achieved by deliberate pivoting of the roof hatch flap. In consequence, only a single displacement drive is necessary for opening and closing of the roof hatch flap on the one hand, and for elevation aiming of the entire launcher unit on the other hand.

Azimuth aiming is carried out in a single-axis joint via which the launcher unit is mounted on the roof hatch cover, in the vicinity of the pivoting axis of said roof hatch cover. The axis of this joint runs at right angles to the plane of the roof hatch flap.

If the smoke grenades are intended to be fired individually from the individual dischargers, individual azimuth aiming of each discharger which is to be used is possible by means of the single-axis joint of the launcher unit. If elevation aiming is also desired, this is possible by correspondingly controlled pivoting of the roof hatch flap.

The individual dischargers are arranged offset with respect to one another in elevation and azimuth in the launcher unit in such a manner that a smoke fan is produced in the event of joint firing activation of all the dischargers belonging to the unit.

If the individual smoke dischargers are detonated in a staggered manner, it is possible, by varying the roof hatch cover pivoting angle and rotating the launcher unit between the individual detonations, deliberately to cover an area with smoke which is larger than in the case of simultaneously, joint launching from all the dischargers.

An embodiment of the invention, which is described in more detail in the following text, is illustrated in the drawing, in which:

Fig. 1 shows the view of an armoured vehicle,

Fig. 2 shows a section, running in the vehicle longitudinal

direction, through a part of the vehicle roof with the roof hatch flap and the launcher unit, which is illustrated without being sectioned, in the retracted, concealed position,

Fig. 3 shows the launcher unit in the illustration according to Fig. 2 in the extended, firing position,

Fig. 4 shows a plan view of the retracted launcher unit with the roof hatch cover cut away, and

Fig. 5 shows the launcher unit in the illustration according to Fig. 4 in the reloading position, rotated in azimuth.

The actual launcher unit 1 is mounted, such that it can rotate in azimuth, on a roof hatch flap 2 which can pivot out of the roof of the vehicle. When the roof hatch flap 2 is closed, the launcher unit 1 is concealed and protected. As a result of the concealment, the launcher unit 1 does not represent an increased radar location risk for the armoured vehicle. The roof hatch flap 2 must be opened for a firing position.

The individual dischargers 3 are rigidly combined with one another in a three-dimensional fan shape to form the launcher unit 1. The alignment of the individual dischargers 3 in the launcher unit 1 is such that a predetermined area is covered with smoke when the smoke grenades are fired simultaneously from all the dischargers 3. The range and depth of this smoke-covered area can be varied by varying the pivoting angle, that is to say the rotation angle of the roof hatch flap 2.

The rotation capability provided with respect to the roof hatch flap, that is to say the azimuth rotation capability, is provided via a bearing 4, which is fitted on the roof hatch flap 2 in the region of its articulation on the vehicle roof and has a rotation axis running at right angles to the roof hatch flap 2. The intrinsically rigid launcher unit 1 engages in the bearing 4 just via the eye 5 which is integrally formed on it.

In order to open, close and deliberately pivot the roof hatch flap 2, said roof hatch flap 2 is mounted in hinges 6 on the vehicle roof, on one side. The pivoting movement is initiated by any actuating drive which may be, for example, a hydraulic cylinder 7 which acts on a pivoting lever 8 of the roof hatch flap 2.

If the launcher unit 1 is used to fire individual shots, respective aiming is carried out by deliberately presetting the rotation angle of the roof hatch flap 2 on the one hand and the rotation angle of the launcher unit 1 on the other hand. As a result of such single-shot operation, the size of the area to be covered with smoke can be varied very well and can be considerably enlarged, especially in comparison with simultaneous, joint firing from all the dischargers 3 of the launcher unit 1.

The reloading of the dischargers 3 is carried out in a protected manner with the roof hatch flap 2 closed. In order that the driver can carry out such reloading easily, the launcher unit 1 is provided in a space to the side of the driver's location or to the side of another crew member. In order that the driver can actually carry out the fitting of the dischargers 3 comfortably, even in the specified confined space, the entire launcher unit 1 can be rotated in the bearing 4, towards the driver or another operator, for this purpose (Fig. 5).

In summarized form, once again, the following advantages, in particular, can be achieved in a very simple manner using the device according to the invention, which is described in the above text only by way of example.

- Reduction of a radar location risk of the vehicle as a result of the smoke grenade launching system being concealed all the time when it is not in operation.
- Elevation and azimuth aiming capability of the launcher unit 1.
- Capability for aimed individual shots as a result of the elevation and azimuth aiming capability of the launcher unit 1.

- Enlargement of the space to be covered by smoke by coordinated single-shot operation of the launcher unit 1.
- Capability to reload the dischargers 3 in the protected position, which is aligned specifically for reloading.



Claims

1. A smoke grenade launching system of an armoured vehicle having a plurality of dischargers which are each aligned differently and are combined three-dimensionally in a fan shape to form a launcher unit, wherein the launcher unit is articulated, such that it can be adjusted in azimuth, on a roof hatch flap of the vehicle, on that side of said flap which is located inside the vehicle in the closed state, the roof hatch flap being pivotable through an adjustable rotation angle about a horizontal axis for elevation aiming of the launcher unit.
2. A smoke grenade launching system according to Claim 1, wherein the roof hatch flap is arranged in the side region of the vehicle, adjacent to a crew member.
3. A smoke grenade launching system according to claim 1 or 2, wherein the dischargers are loadable with the roof hatch flap in the closed position.
4. A smoke grenade launching system according to claim 1, 2 or 3, wherein the dischargers are operable selectively individually or simultaneously.
5. A smoke grenade launching system of an armoured vehicle, substantially as described herein with reference to and as illustrated in the accompanying drawings.

**Patents Act 1977**  
**Examiner's report to the Comptroller under Section 17**  
**(The Search report)**

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GB 9421994.6

**Relevant Technical Fields**

- (i) UK Cl (Ed.M)      F3C (CAJ, CGA, CGX, CJA, CMA, CMB)  
(ii) Int Cl (Ed.5)      F41A, F41F, F41H

Search Examiner  
Trevor Berry

Date of completion of Search  
28 November 1994

**Databases (see below)**

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

Documents considered relevant following a search in respect of Claims :-  
1 to 5

(ii) ONLINE DATABASE WPI

**Categories of documents**

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|---|---|
| <b>X:</b> Document indicating lack of novelty or of inventive step.   | <b>P:</b> Document published on or after the declared priority date but before the filing date of the present application.        |
| <b>Y:</b> Document indicating lack of inventive step if combined with one or more other documents of the same category. | <b>E:</b> Patent document published on or after, but with priority date earlier than, the filing date of the present application. |
| <b>A:</b> Document indicating technological background and/or state of the art.   | <b>&amp;:</b> Member of the same patent family; corresponding document.   |

Category	Identity of document and relevant passages	Relevant to claim(s)
X	GB 1522042 (CREUSOT-LOIRE)	1
X	US 4715263 (McDONNEL DOUGLAS)	1

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